

Appendix A1: Documentation of Mixed Stock Status and GIS Mapping

DATE: 10/22/2007

TO: ASMFC Striped Bass Technical Committee

FROM: Wilson Laney, USFWS South Atlantic Fisheries Coordination Office

RE: Cooperative Winter Tagging Cruise Maps

Numerous past tagging studies have documented the fact that migratory striped bass wintering off the coasts of North Carolina and Virginia originate from stocks spawning from North Carolina north (Boreman and Lewis 1987, North Carolina Striped Bass Study Management Board 1991). As a part of the current stock assessment, the ASMFC Striped Bass Tagging Subcommittee was requested to analyze the 20-year time series of striped bass tag and recapture data from the Cooperative Winter Tagging Cruise (Cruises) conducted annually from 1988-2007 by the U.S. Fish and Wildlife Service and partners (see Welsh and others 2007, and Laney and others 2007a for descriptions of study area and methods) and prepare GIS-based maps of the distribution of released, tagged fish, and subsequent recaptures.

Raw data from the Cruises from the Maryland Department of Natural Resources-Fisheries Service database, and recapture data from the U.S. Fish and Wildlife Service coastwide striped bass tagging database, were reformatted as needed and analyzed using GIS (ArcGIS). Although maps were generated for every Cruise year (Laney and others 2007b), for the sake of brevity we have presented only those for the initial cruise year (1988) and every fifth year thereafter (1993, 1998, and 2003). Three maps for each year depict the distribution of striped bass captured, tagged, and released on the winter grounds; the distribution within the following year of all recaptures from a given Cruise; and the distribution of 28 inch or greater recaptures from a given Cruise for only the months March-April-May following the Cruise (see Figures 1-12). The latter two map types plot recaptures as the centroid of the NOAA grid cell in which the fish were recaptured, since exact locality data for most recaptures is lacking.

The resultant maps (and associated data) clearly indicate, especially when viewing spring recaptures only, that the migratory striped bass wintering off NC and VA are from multiple stocks, including the Albemarle-Roanoke, Chesapeake Bay, Delaware and Hudson, at a minimum. Results of this analysis confirm those of prior studies (Boreman and Lewis 1987, Welsh and others 2007).

References

- Boreman J, Lewis RR. 1987. Atlantic coastal migration of striped bass. *Am Fish Soc Symp* 1:331-339.
- Laney RW, Hightower JE, Versak BR, Mangold MF, Cole WW, Winslow SE. 2007a. Distribution, habitat use, and size of Atlantic sturgeon captured during Cooperative Winter Tagging Cruises, 1988-2006. *Am Fish Soc Symp* 56:167-182.
- Laney RW, Newcomb DJ, Versak BR, McCrobie T, Welsh SA. 2007b. Documentation of Atlantic migratory striped bass stock mixing through tag returns. Report to the Atlantic States Marine Fisheries Commission, Striped Bass Stock Assessment Subcommittee, Striped Bass Tagging Subcommittee, Striped Bass Technical Committee and Striped Bass Management Board. U.S. Fish and Wildlife Service South Atlantic Fisheries Coordination Office, Raleigh, North Carolina. (In preparation)
- North Carolina Striped Bass Study Management Board. 1991. Report on the Albemarle Sound-Roanoke River stock of striped bass. U.S. Fish and Wildlife Service, South Atlantic Fisheries Coordination Office, Morehead City, Raleigh, (NC). 56 p. + appendices.
- Welsh SA, Smith DR, Laney RW, Tipton RC. 2007. Tag-based estimates of annual fishing mortality of a mixed Atlantic coastal stock of striped bass. *Trans Am Fish Soc.* 136:34-42.

Appendix A1 Figures

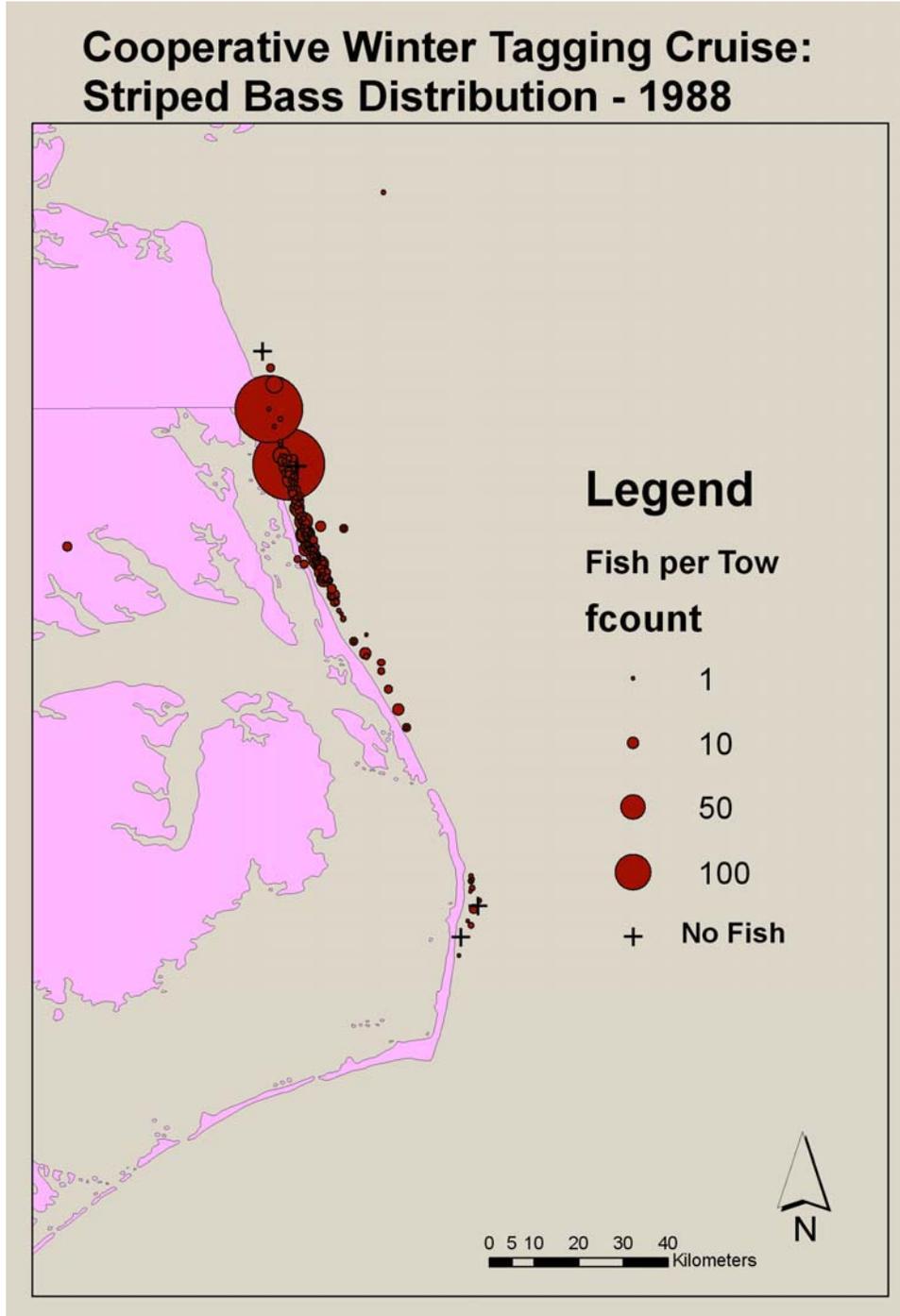


Figure 1. Distribution of striped bass captured on the wintering grounds during the 1988 Cooperative Winter Tagging Cruise

Recaptures by NOAA Zone Centroids 2/1/1988 - 1/31/1989

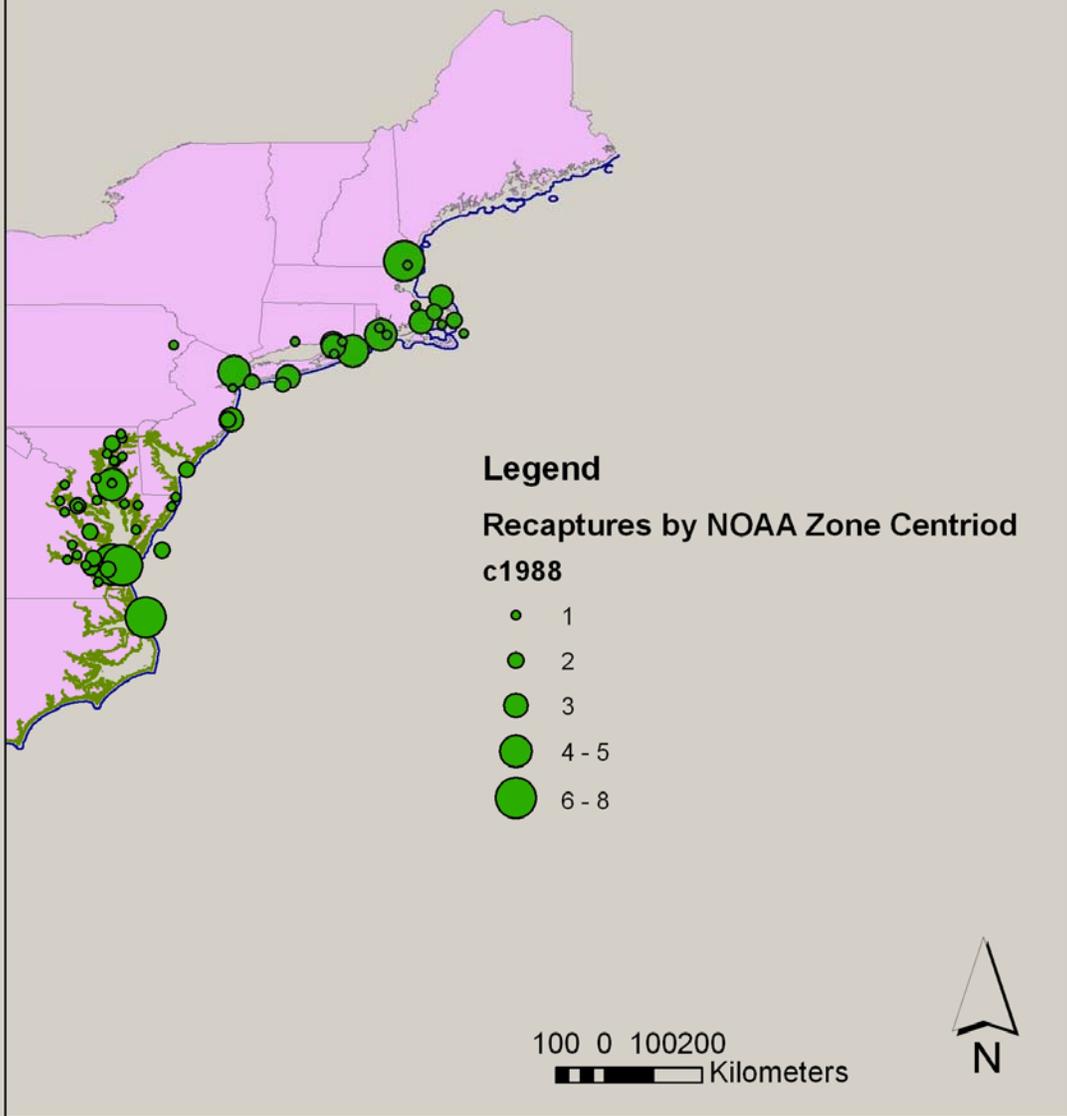


Figure 2. Distribution of all striped bass recaptures from 2/1/1988 – 1/31/1989 tagged during the 1988 Cooperative Winter Tagging Cruise

CY 1988 Same Year Spring Recaptures by NOAA Zone Centroids Length > 711 mm

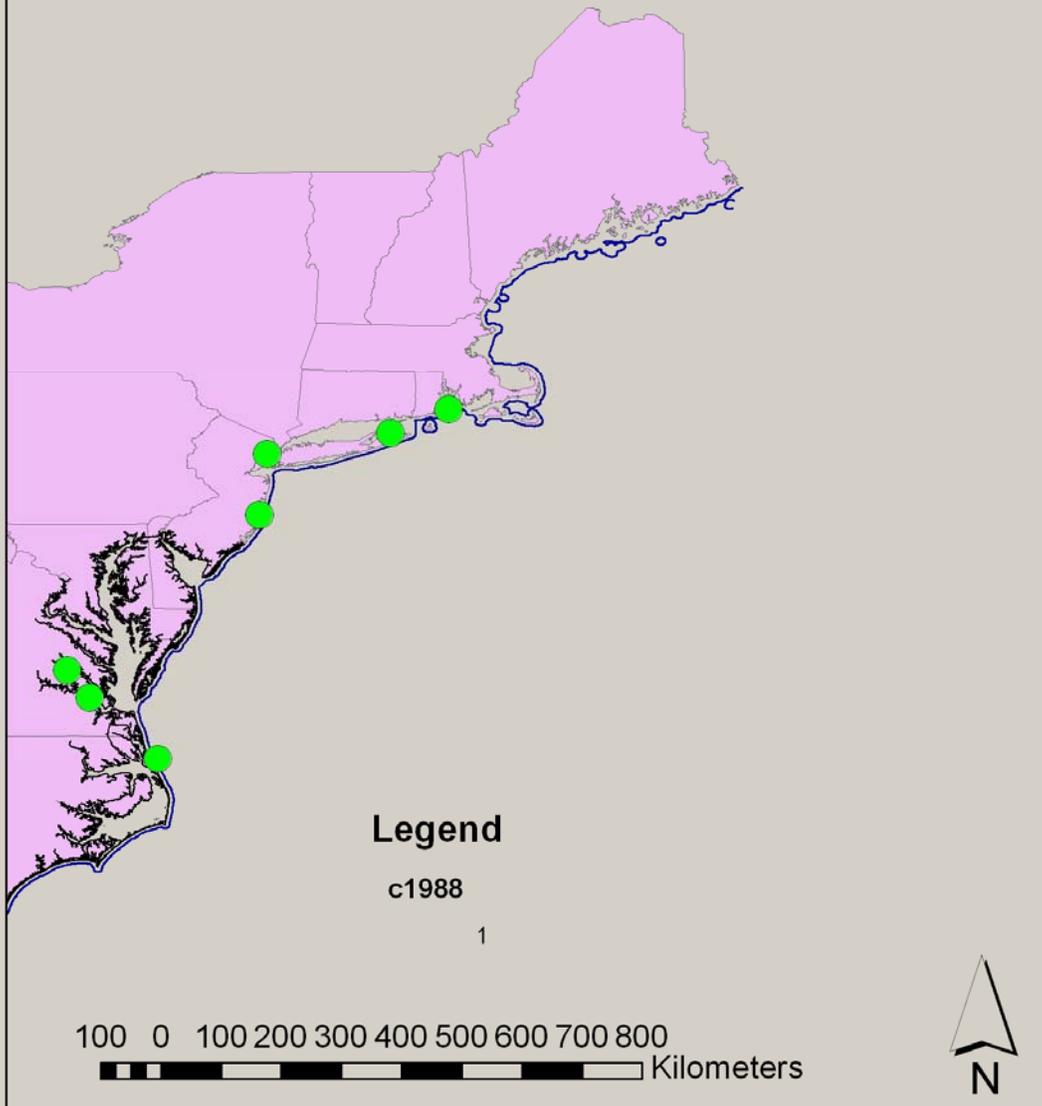


Figure 3. Distribution of 1988 spring recaptures of striped bass >711 mm and tagged during the 1988 Cooperative Winter Tagging Cruise

Cooperative Winter Tagging Cruise: Striped Bass Distribution - 1993

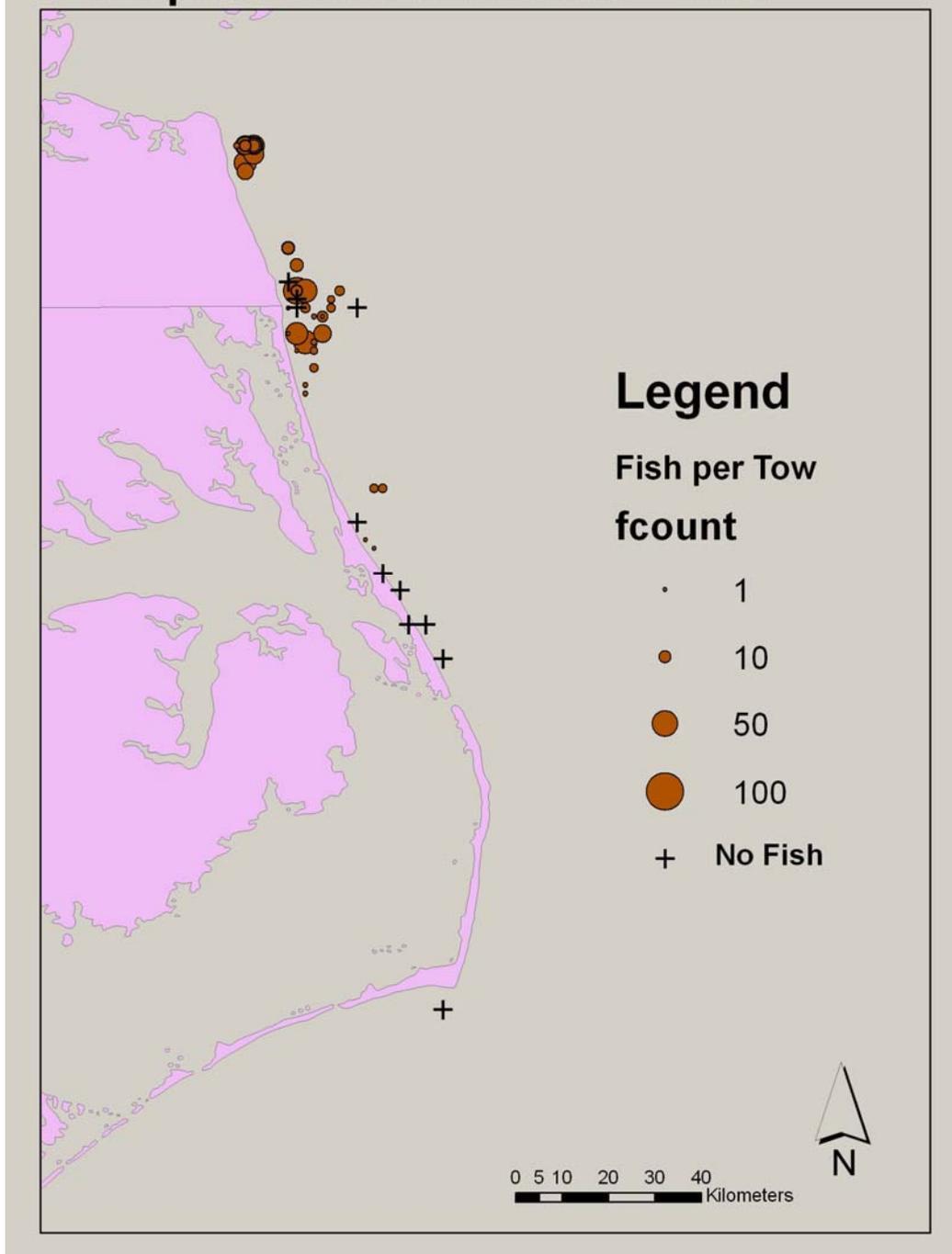


Figure 4. Distribution of striped bass captured on the wintering grounds during the 1993 Cooperative Winter Tagging Cruise

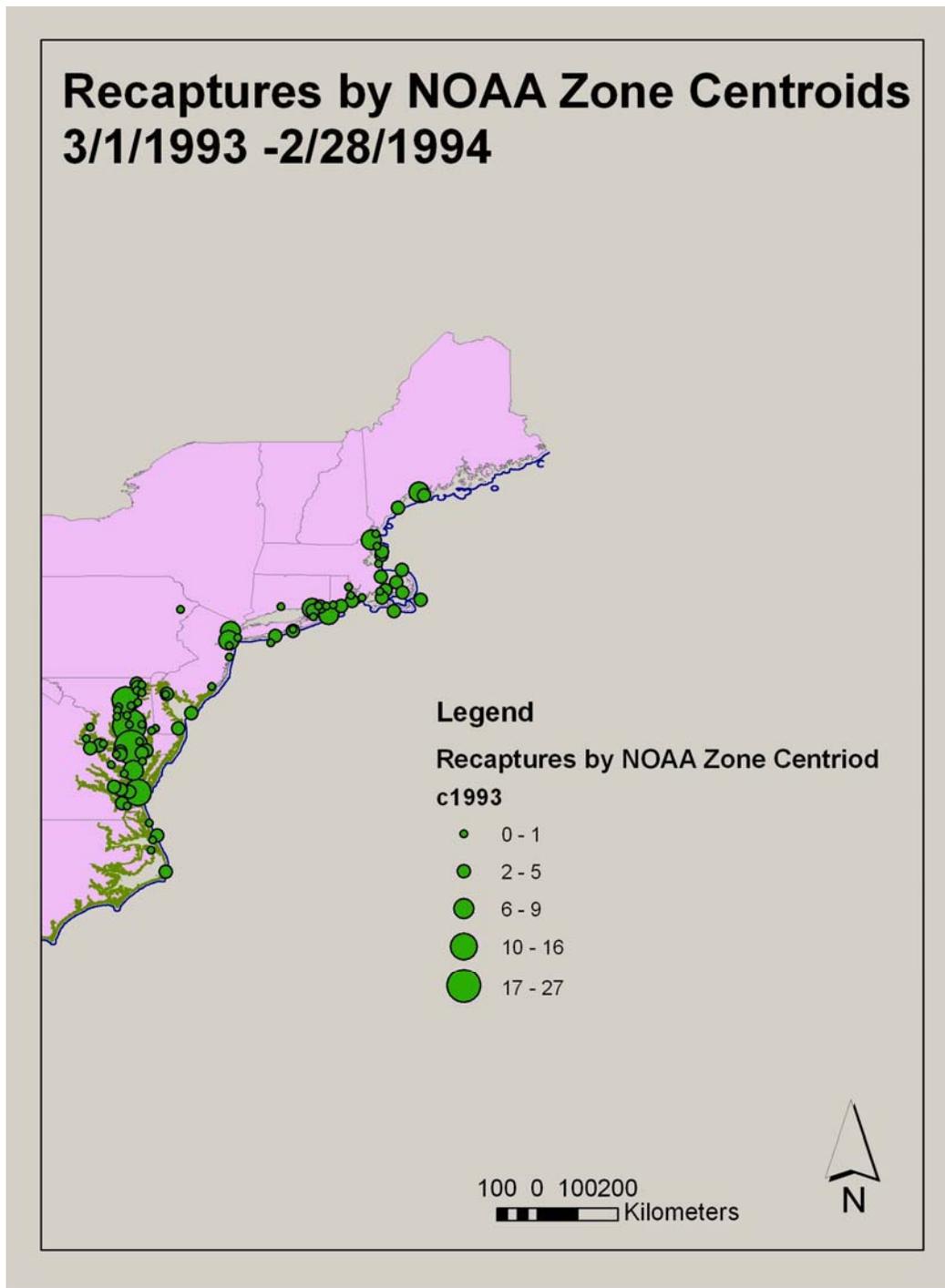


Figure 5. Distribution of all striped bass recaptures from 3/1/1993 – 2/28/1994 tagged during the 1993 Cooperative Winter Tagging Cruise

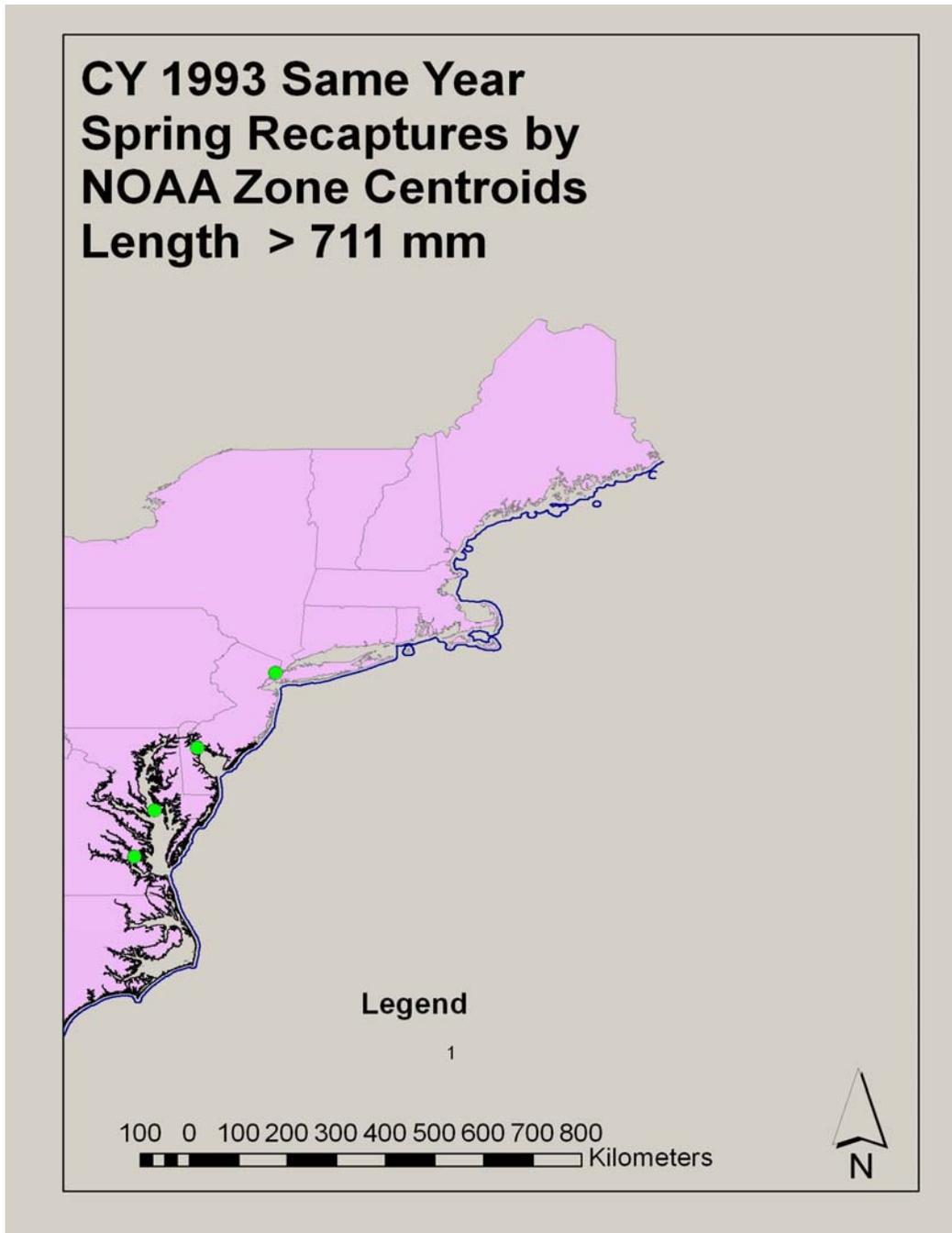


Figure 6. Distribution of 1993 spring recaptures of striped bass >711 mm and tagged during the 1993 Cooperative Winter Tagging Cruise

Cooperative Winter Tagging Cruise: Striped Bass Distribution - 1998

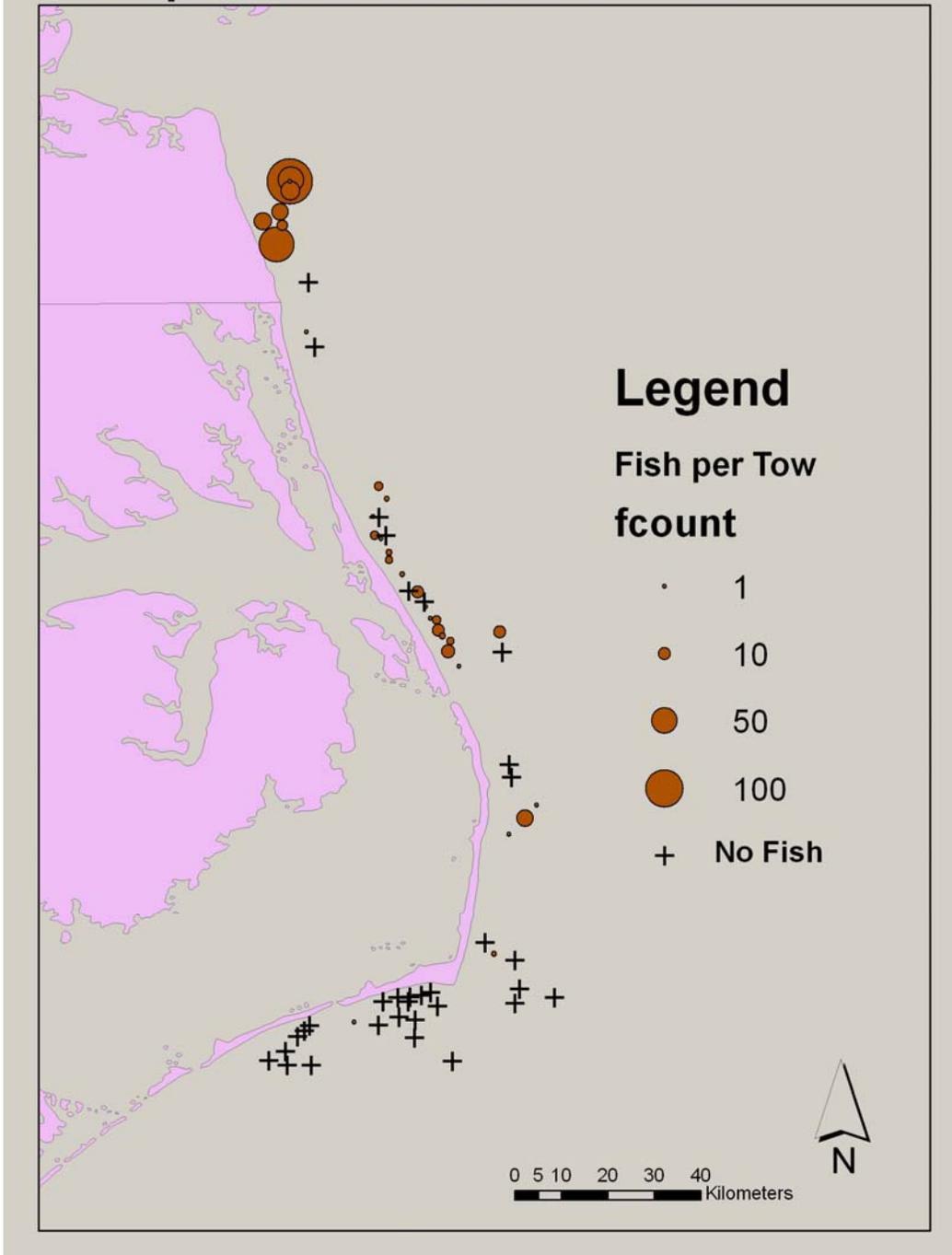


Figure 7. Distribution of striped bass captured on the wintering grounds during the 1998 Cooperative Winter Tagging Cruise

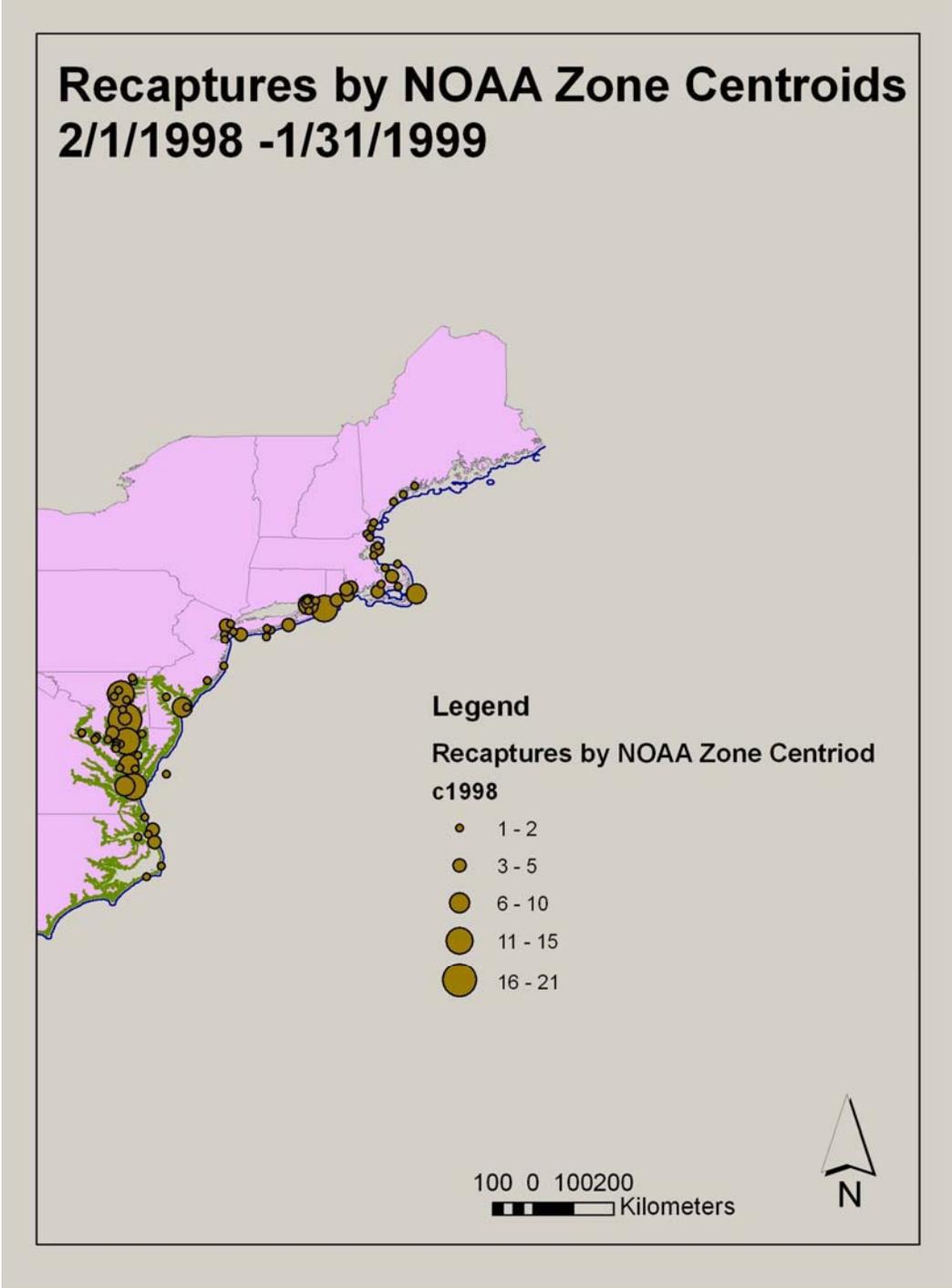


Figure 8. Distribution of all striped bass recaptures from 2/1/1998 – 1/31/1999 tagged during the 1998 Cooperative Winter Tagging Cruise

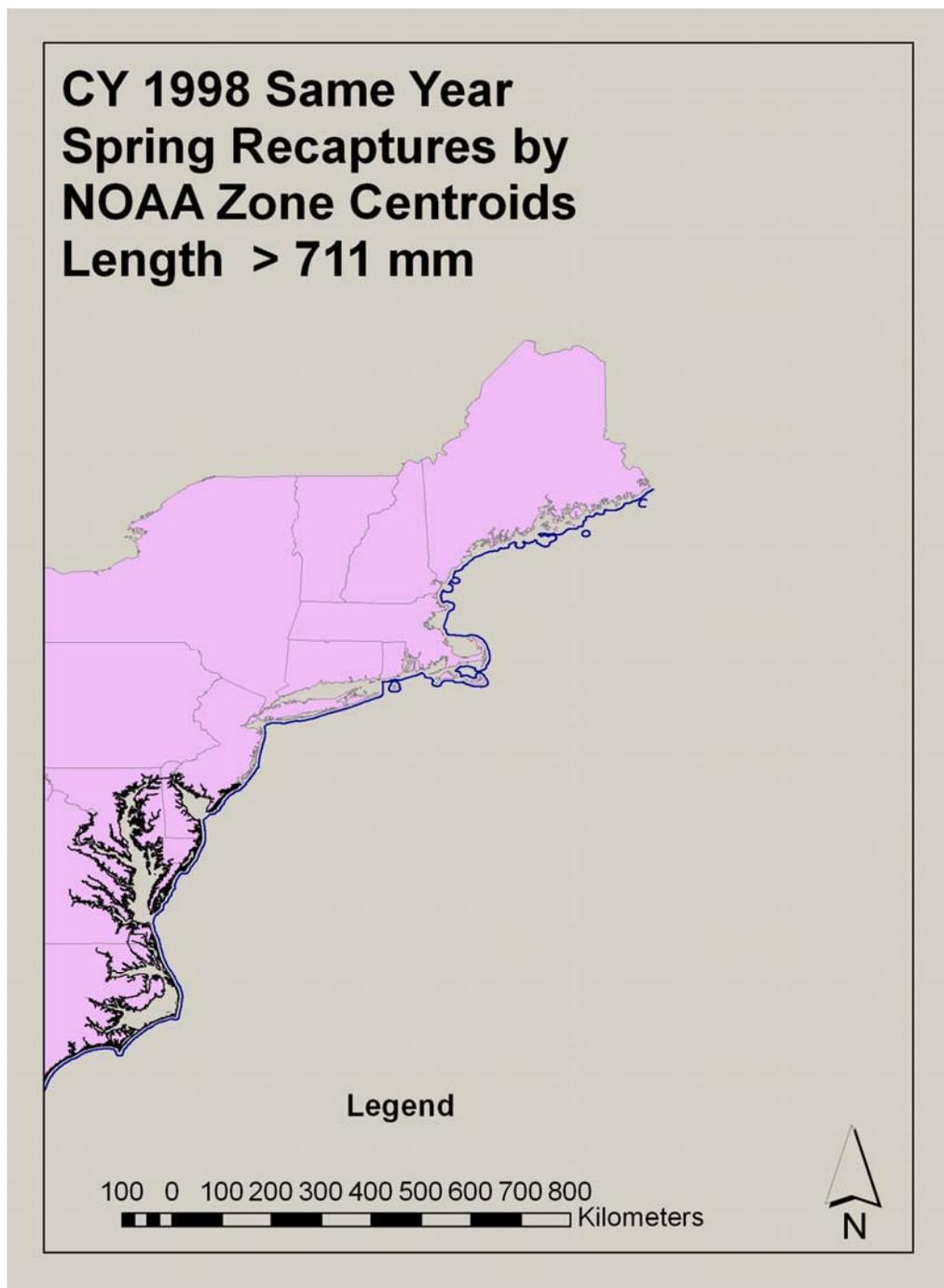


Figure 9. Distribution of 1998 spring recaptures of striped bass >711 mm and tagged during the 1998 Cooperative Winter Tagging Cruise

Cooperative Winter Tagging Cruise: Striped Bass Distribution - 2003

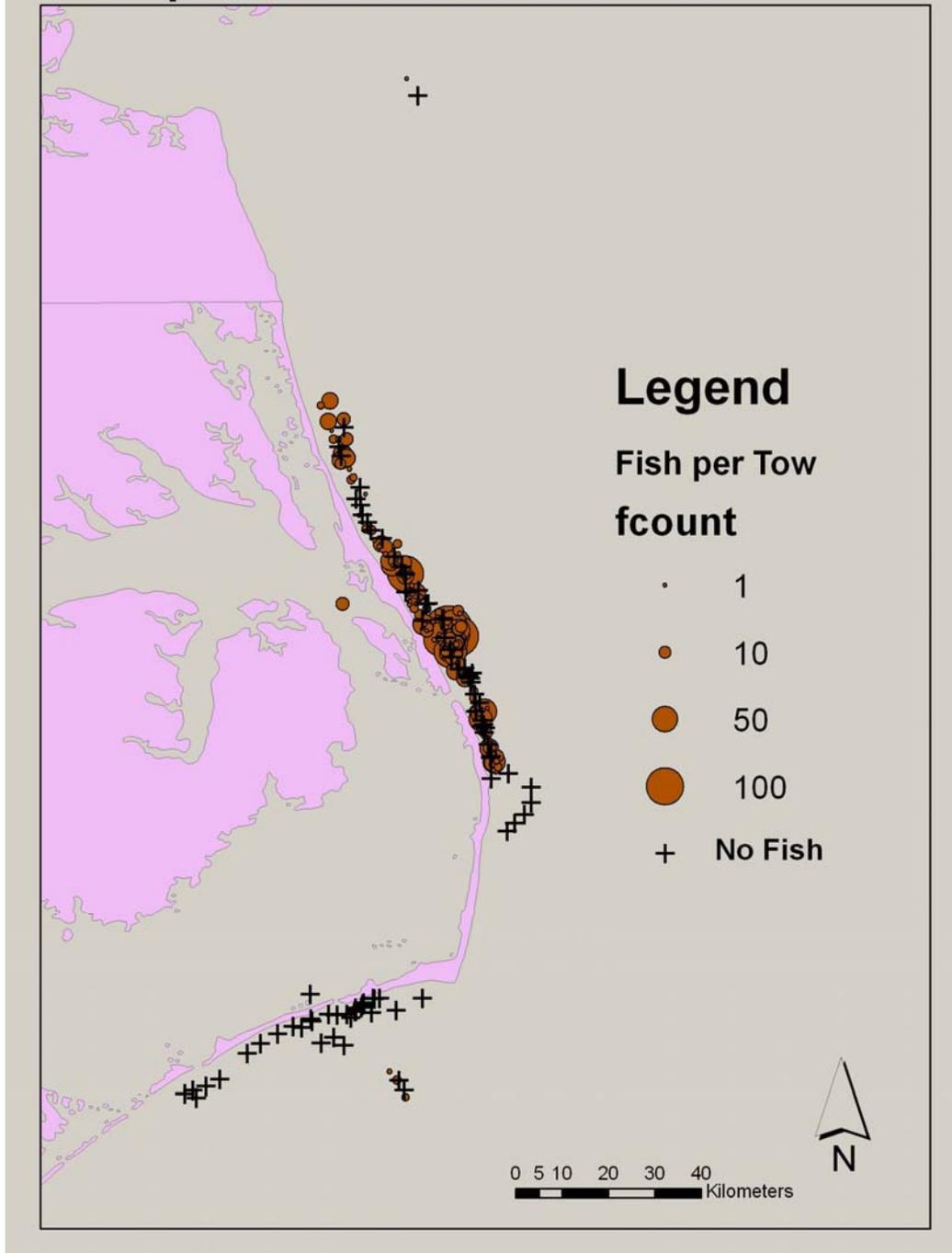


Figure 10. Distribution of striped bass captured on the wintering grounds during the 2003 Cooperative Winter Tagging Cruise

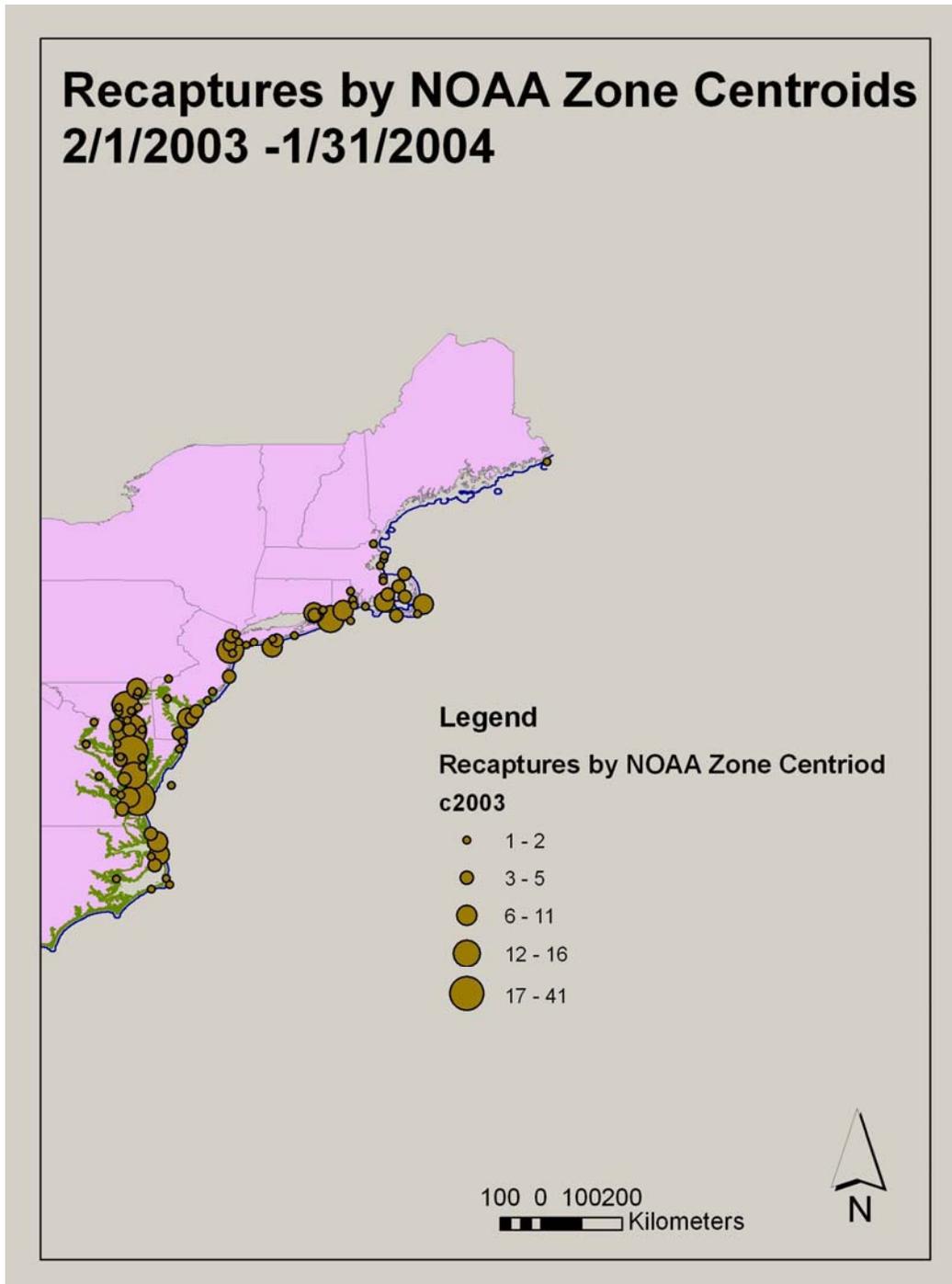


Figure 11. Distribution of all striped bass recaptures from 2/1/2003 – 1/31/2004 tagged during the 2003 Cooperative Winter Tagging Cruise

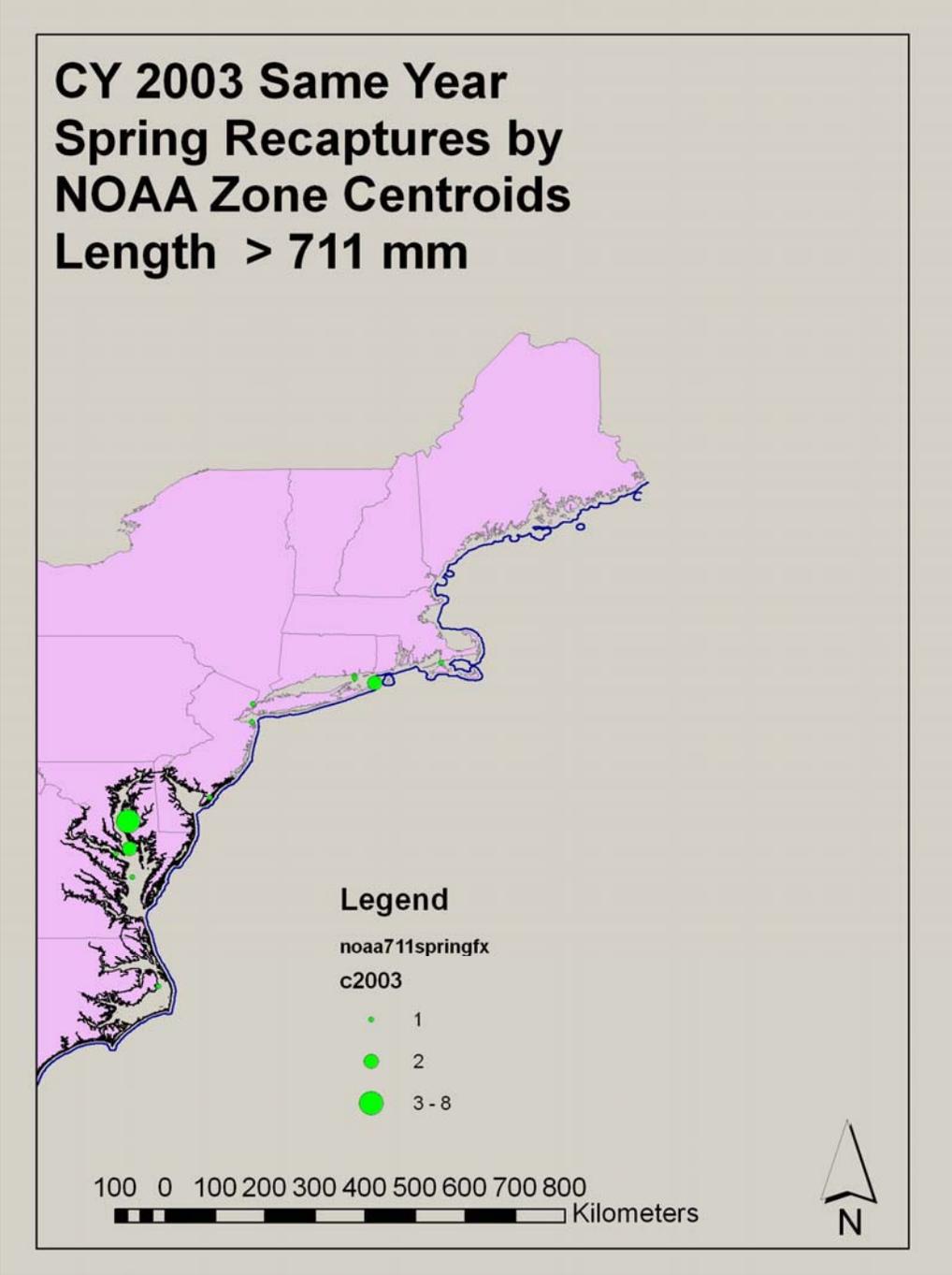


Figure 12. Distribution of 2003 spring recaptures of striped bass >711 mm and tagged during the 2003 Cooperative Winter Tagging Cruise